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CHINGUETTI - TERRESTRIAL AGE AND PRE-ATMOSPHERIC SIZE. K.C. Welten[1], P.A. Bland[2], M. W. Caffee[3], J. Masarik[1], S.S. Russell[2], I. Denyer[5], J. Lloyd[6] and M.M. GRADY[2], [1]Space Sciences Laboratory, University of California, Berkeley, CA 94720-7450, USA; [2]Department of Mineralogy, Natural History Museum, Cromwell Road, London SW7 5BD; [3]CAMS, Lawrence Livermore National Laboratory, Livermore, CA 94551, USA;; [5]I Denyer, 5 Statham Grove, Stoke Newington, London N16 9DP; [6]Flat 2, 60 Brixton Road, London SW9 6BS.

Introduction. Chinguetti is a 4.5 kg mesosiderite find recovered from the Adra region of Mauretania, some 45 km from the oasis town of Chinguetti, in 1916. It was, however, several years before the sample was identified as a meteorite. When it was, and the description of the find was released in 1924, it generated considerable excitement. Gaston Ripert, the French officer who found the meteorite, maintained that it was a representative sample of a much larger mass. His description, as transcribed by Lacroix (1924), states: "It was lying on top of an enormous metallic mass measuring about 100m on one side and about 40m in height, which stands up in the middle of the dunes...".Ripert's position as a French officer, and his comparative lack of interest in the find (he turned the sample over to M.H. Hubert, a freind and a Doctor of Science in Dakar, and in the intervening years between the find and the announcement in 1924, made no effort to follow up on any progress made in its analysis, and in fact never claimed that it was a meteorite) convinced many that his story was true. Numerous expeditions have attempted to find the larger mass, and several explanations offered to explain their failure: the find location being somewhat uncertain, possibly dunes had partially or completely covered the mass; Ripert may have mistaken desert varnished sandstone for a large metallic mass, and just happened by chance on the smaller sample; or, for his own reasons, he simply lied. To elucidate this problem, we chose to analyse a portion of the recovered sample for cosmogenic radionuclides, to determine its terrestrial age, and its pre-atmospheric radius.

Experimental Procedures. We analyzed a chip taken about 5 cm from the fusion crust. We separated both metal and stone fraction. After adding carrier, containing Be, Al, Cl and Ca, the metal and stone fractions were dissolved in 1.5N HNO_3 and concentrated HF/HNO_3, respectively. The Be, Al and Cl were separated and ^{10}Be, and ^{36}Cl concentrations were determined using the LLNL-AMS facility(Davis et al., 1990).

Results and discussion. The ^{10}Be and ^{36}Cl results are shown in Table 1, whereas the ^{26}Al measurements are still in progress.

Table 1. Cosmogenic radionuclide concentrations in Chinguetti mesosiderite.

	Conc. (dpm/kg)*
^{10}Be(stone)	21.2 ± 0.3
^{10}Be(metal)	3.35 ± 0.05
^{36}Cl(metal)	17.4 ± 0.2

* 1σ-errors include all known AMS errors, but not theuncertainties in the AMS standards

Although the cosmic-ray exposure age of Chinguetti is unknown, the saturation activity level of ^{10}Be in stone phase suggests that the exposure age of the meteorite is more than 5 My. Mesosiderites typically have exposure ages 10-300 My [5]. The ^{36}Cl-^{10}Be terrestrial age method [6] yields a terrestrial age <30 kyMeasurements of ^{41}Ca in the metal phase and ^{14}C in the stone phase will further constrain the terrestrial age of Chinguetti.

Pre-atmospheric size. The low concentration of ^{36}Cl and ^{10}Be in the metal phase relative to the saturation activities of those nuclides in meteorites of typical size

suggests that Chinguetti was exposed to energetic particles while moderately shielded. According to Monte-Carlo based calculations for the production rates of ^{10}Be and ^{36}Cl, we can constrain the pre-atmospheric radius to 50-80 cm and the shielding depths of 15-25 cm

Conclusions. These data indicate that Chinguetti is a comparatively recent fall, at least, too recent to be consistent with Ripert's original description of the main mass having a heavily wind eroded base. More compelling is our estimate of a pre-atmospheric radius of <1m, suggesting that Ripert was either mistaken, or for some reason falsified his description of the find.

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